

Please replace the abstract beginning on page 60 with the following replacement abstract:

#### **ABSTRACT**

Methods for coupling a superconducting qubit to a resonant control circuit. An interaction term between the qubit and the circuit initially has a diagonal component. A recoupling operation is applied to the qubit. The circuit is tuned so that a frequency of the qubit and circuit match. A second recoupling operation transforms the term to have only off-diagonal components. A method for entangling a state of two qubits coupled to a bus with a control circuit. An interaction term between at least one of the qubits and the circuit has a diagonal component. A recoupling operation is applied to at least one of the qubits such that the term has only off-diagonal components. The frequency of the circuit is tuned to the frequency of the first qubit, and then tuned to the frequency of the second qubit. The recoupling operation is reapplied to at least one of the qubits.